The Arctic Network

Vital Signs of the Arctic

Monitoring Framework	Vital Sign	Parks Where Monitored				
		BELA	CAKR	GAAR	KOVA	NOAT
Air and Climate	Airborne Contaminants			●		
	Climate	●	●	●	●	●
	Snowpack	●	●	●	●	●
Geology and Soils	Coastal Erosion	●	●			
	Sea Ice	○	○			
	Permafrost	●	●	●	●	●
Water	Lake Communities and Ecosystems	●	●	●	●	●
	Lagoon Communities and Ecosystems		●			
	Stream Communities and Ecosystems	●	●	●	●	●
	Surface Water Dynamics	+	+	+	+	+
Biological Integrity	Land Birds	●	●	●	●	●
	Yellow-billed Loons	●	●			
	Brown Bears	●	●	●		●
	Dall's Sheep			●	●	●
	Muskox	●	●			
	Caribou	○	○	○	○	○
	Moose	○	○	○	○	○
	Fish Assemblages	+	+	+	+	+
	Small Mammal Assemblages	+	+	+	+	+
	Terrestrial Vegetation and Soils	●	●	●	●	●
	Invasive/Exotic Species	+	+	+	+	+
Human Use	Subsistence/Harvest	○	○	○	○	○
	Point Source Human Effects		+	+		+
Landscapes	Fire Extent and Severity	○	○	○	○	○
	Landscape Patterns and Dynamics	●	●	●	●	●

● Vital signs for which the network will develop protocols and implement monitoring with funding from the vital signs or water quality monitoring program.

○ Vital signs that are currently being monitored long-term by a network park, another NPS program, or by another federal or state agency. The network will collaborate with these other monitoring efforts where appropriate but will not use vital signs or water quality monitoring program funds.

+ Vital signs for which monitoring will likely be done in the future but which cannot currently be implemented due to limited staff and funding.

NPS photograph

By Jim Lawler

The Arctic Network (ARCN) is composed of Bering Land Bridge National Preserve, Cape Krusenstern National Monument, Gates of the Arctic National Park and Preserve, Kobuk Valley National Park, and Noatak National Preserve. Park units in the network contain approximately 19.3 million acres, or a little less then 25% of the land area of National Park Service (NPS)-managed units in the United States. The ARCN parks contain a broad array of the ecosystems typical of the subarctic (boreal forest) and arctic (tundra) biomes of northwestern North America. The boundary, or ecotone, between these two biomes is represented in many different phases. In addition, these parks encompass large areas of mountainous terrain, including a major portion of the Brooks Range.

Perhaps nothing defines ARCN as much as climate. The climate of the ARCN parks varies from the extreme continentality of interior Alaska to the maritime coastal areas. However, this maritime climate is somewhat modified by the presence of pack ice, which minimizes the moderating effect of the sea during the six to nine months it is present. Winters, even in coastal areas, are intensely cold. In the tapestry of this landscape, ARCN boasts unusual geomorphic features such as permafrost, hot springs, recent volcanic flows and extensive sand dunes. The 230 miles of coastline, punctuated by coastal lagoons, serves as important habitat for fish and birds. Freshwater resources include deep lakes, shallow permafrost related ponds and free flowing rivers including seven designated wild and scenic rivers. Plant communities, ranging from spruce forests to coastal sedge meadows support diverse population of wildlife. Birds, such as the northern wheatear, travel from as far away as northern Africa to breed in ARCN parks. Intact mammalian predator-prey relationships, such as those involving wolverines and Dall's sheep, are free to unfold here. Yet people are not foreign to this landscape as local area residents continue to practice their subsistence traditions here.

With the help of NPS staff and experts from a broad array of specialties, ARCN has identified 19 elements and processes of park ecosystems for which we will begin monitoring in the next three years. These elements and processes are termed vital signs. Vital signs that we will be tracking include four related to air and climate (wetand dry contaminant deposition, air contaminants, climate and snowpack), two related to geology and soil (coastal erosion and permafrost), three related to water (lagoon communities and ecosystems, lake communities and ecosystems, and stream communities and ecosystems), one related to human use (subsistence/harvest), two related to ecosystem patterns and processes (fire extent and severity, and terrestrial landscape patterns and dynamics), and seven related to biological integrity (landbirds, yellow-billed loons, brown bears, caribou, Dall's sheep, muskox, and terrestrial vegetation and soils). This broad based, scientifically sound information obtained through monitoring will have multiple applications for management decision-making, education and promoting public understanding of park resources.

Figure 1. Monitoring in the Arctic Network include many uniquely arctic organisms such as these muskoxen in Bering Land Bridge National Preserve.